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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/581,468	06/12/2000	MASASHIGE SATO	1111.64360	9963

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EXAMINER

BLOUIN, MARK S

ART UNIT

PAPER NUMBER

2653

DATE MAILED: 08/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/581,468

Applicant(s)

SATO ET AL.

Examiner

Mark Blouin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) 5 and 6 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

Detailed Action

Claim Objections

1. Claims 5 and 6 are objected to because of the following informalities: When referenced, list claims in numerical order. Change "4 or 2" to "2 or 4". Appropriate correction is required.

Claim Rejections – 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Noguchi et al. (USPN 5,862,022).
4. Regarding Claims 1 and 2, Noguchi et al. shows (Fig. 46) a magnetic sensor including a ferromagnetic tunnel junction (21) comprising a free layer (211) a magnetic direction of which freely rotates, a barrier layer formed (210+213) on the free layer and having a smaller thickness in a first region (D1), a region of the free layer corresponding to the first region functioning as a

sensor portion for sensing an external magnetic field, wherein the barrier layer is formed by oxidizing the surface of a metal (Col. 10, lines 17-20).

5. Regarding Claim 3, Noguchi et al. shows (Fig. 46) a magnetic sensor comprising a fixed layer (212) formed on the barrier layer (210+213), an anti-ferromagnetic layer (216) formed on the fixed layer (212) and fixing a magnetic direction of the fixed layer.

6. Regarding Claim 4, Noguchi et al. shows (Fig. 42) a magnetic sensor wherein the free layer in a region where the fixed layer is not formed is bent away from the fixed layer. The free layer (211) is formed in and occupies its own region below the fixed layer (212) and bends away from the fixed layer at a point in the vicinity above the end of the electrode (22).

7. Regarding Claims 5 and 6, Noguchi et al. shows a magnetic head and magnetic encoder comprising the magnetic sensor (Fig. 23). A magnetic head serves to encode data on recording media and thereby functions as a magnetic encoder.

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

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9. Claims 7-9,14, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Gill (USPN 6,108,177).

10. Regarding Claims 7-9,14 and 17, Gill shows (Fig. 9) a hard disk device comprising a magnetic head comprising a ferromagnetic tunnel junction element including a free layer (210) a magnetic direction of which freely rotates, and a fixed layer (206) which is opposed to one surface of the free layer through a barrier layer (208) and a magnetic direction of which is fixed by a anti-ferromagnetic layer (204) which is adjacent thereto, the free layer being connected smoothly to a grounded member of high permeability (212), neighboring the same, in a region spaced from a signal detection surface.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 7,8,11,12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi et al. in view of Gill.

13. Regarding Claims 7,8,11,12, and 15, Noguchi et al. shows a magnetic tunnel junction wherein the thickness of the barrier layer near the edge of the fixed layer is larger than a thickness of the barrier layer near a central part of the fixed layer, the free layer is formed wider in a region spaced from the signal detection surface, and the free layer in a region which is not opposed to the fixed layer is bent away from the fixed layer. Noguchi et al. does not show the free layer connected to a member of high permeability in a region space from a signal detection

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surface. Gill shows a free layer connected to a member of high permeability in a region space from a signal detection surface. It would have been obvious to one with ordinary skill in the art at the time the invention was made to combine the magnetic tunnel junction of Noguchi et al. with the magnetic head of Gill. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to combine the magnetic tunnel junction of Noguchi et al. with the magnetic head of Gill in which a high magneto-resistive ratio can be achieved with good reproduction characteristics.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gill in view of Sakakima et al. (EPN 791 916 A2).

14. Regarding Claim 10, Gill shows the features of the magnetic head described above, but does not show the member of high permeability is a shield layer formed, spaced from the ferromagnetic tunnel junction element. Sakakima et al. shows (Fig. 1, (10a) and (10b)) the member of high permeability is a shield layer formed, spaced from the ferromagnetic tunnel junction element. It would have been obvious to one with ordinary skill in the art at the time the invention was made to provide the head of Gill with shields spaced from the ferromagnetic tunnel junction element as taught by Sakakima et al. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to provide the head of Gill with shields spaced from the ferromagnetic tunnel junction element as taught by Sakakima et al. so that a very high density magnetic recording head having a remarkably narrow shield gap length is obtained.

15. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gill in view of Fujishima et al. (JPN 07073419A).

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16. Regarding Claim 13, Gill shows the features of the magnetic head described above, however, does not show the fixed layer is not exposed to the signal detection surface. Fujishima shows (Fig. 1) the fixed layer is not exposed to the signal detection surface. It would have been obvious to one with ordinary skill in the art at the time the invention was made to move the head of Gill away from the signal detection surface as taught by Fujishima. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to move the head of Gill away from the signal detection surface as taught by Fujishima in order to prevent damage, corrosion, and static electricity from discharging between members.

17. Regarding Claim 16, Gill shows the features of the magnetic head described above, however, does not show a ferromagnetic tunnel junction element further including another fixed layer which is opposed to the free layer, a magnetic direction of another fixed layer being fixed by another anti-ferromagnetic layer which is adjacent thereto. Official Notice is taken that dual ferromagnetic tunnel junction elements are old and well known in the art, therefore, it would have been obvious to one of ordinary skill in the art to combine the aforementioned features with the magnetic head of Gill. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to combine the dual ferromagnetic tunnel junction element with the magnetic head of Gill in order to provide more signal as there is spin dependent scattering on both sides of the free layer.

18. Regarding Claim 18, Gill shows the features of the magnetic head described above, however, does not show a disk array device comprising a plurality of hard disk devices. Official Notice is taken that disk array devices comprising a plurality of hard disk devices are old and well known in the art, therefore, it would have been obvious to one of ordinary skill in the art to

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combine the aforementioned features with the magnetic head of Gill. The rationale is as follows:
One of ordinary skill in the art at the time of invention would have been motivated to combine the disk array device comprising a plurality of hard disk devices with the magnetic head of Gill in order to increase storage capacity.

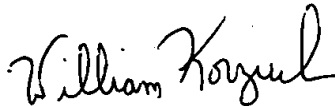
Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Blouin whose telephone number is (703) 305-5629. The examiner can normally be reached M-F, 6:00 am – 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful the examiner's supervisor, William Korzuch can be reached at (703) 305-6137. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314 for regular and After Final communications.

Any inquiry of general nature or relating to the status of application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Mark Blouin
Patent Examiner
Art Unit 2653
July 24, 2002


WILLIAM KORZUCH
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